

First Five-Year Review Report
for
Basin Mining National Priority List
Site

Basin, Montana

May 2008

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5/20/08

Final

**First Five-Year Review Report
for Town of Basin Project
Operable Unit 1
Basin Mining Area
Jefferson County, Montana**

Prepared for

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Acronyms and Abbreviations

µg/L	micrograms per liter
ARARs	applicable or relevant and appropriate requirements
ASL	maximum concentration above screening level
bgs	below ground surface
BSL	maximum concentration below screening level
CDM Federal	CDM Federal Programs Corporation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	chemicals of concern
COPCs	chemicals of potential concern
cy	cubic yards
DEQ	Montana Department of Environmental Quality
E&E	Ecology and Environment, Inc.
ESI	Expanded Site Inspection
FS	Feasibility Study
IC	Institutional controls
IEUBK	Integrated Exposure Uptake Biokinetic
MCL	maximum contaminant level
MDHES	Montana Department of Health and Environmental Services
MDSL AMRB	Montana Department of State Lands, Abandoned Mine Reclamation Bureau
MDT	Montana Department of Transportation
mg/kg	milligram per kilogram
mg/L	milligrams per liter
NA	not available
ND	not detected
NPL	National Priorities List

NSL	no screening level; chemical is retained as a chemical of potential concern
O&M	Operations and Maintenance
OU	Operable Unit
PA	Preliminary Assessment
PRG	preliminary remediation goal
RAO	remedial action objectives
RI	Remedial Investigation
ROD	Record of Decision
SDWA	Safe Drinking Water Act
SSI	Screening Site Inspection
USEPA	U. S. Environmental Protection Agency
WWTP	wastewater treatment plant

Executive Summary

Hard rock mining in the Basin Mining Area Superfund Site began in the 1870s and continued intermittently into the late 1950s. Extensive mining and milling within the Basin Mining Area have resulted in uncontrolled releases of metal contaminants from waste rock and tailings (waste material from processing of mineral ore) and have contaminated water in local streams.

The Basin Mining Area Superfund Site is located within and around the town of Basin in Jefferson County, Montana (Figure 1a). The Superfund Site was organized into two operable units (OU): the community of Basin, Montana (Town of Basin OU1, see Figure 1), and the surrounding watersheds of Basin Creek, Cataract Creek, and part of the upper Boulder River (Watershed OU2).

This Five-Year Review Report is for the Town of Basin OU1, located in Sections 17 and 18, Township 6 north, range 5 west in the United States Geological Survey (USGS) Basin Quadrangle, and includes contaminated residential soils, a former smelter area, streamside tailings, several tailings piles spread throughout town, and a mill site. The Record of Decision (ROD) for the Basin Mining Area OU1 was produced in March 2001. A Record of Decision for the Basin Watershed, OU2, has not yet been prepared.

Contaminated media at this site included surface and subsurface soil, residual tailings, ore and waste rock piles, surface water, groundwater, and stream sediment. Findings of the human health and environmental risk assessments concluded that the primary human health risks were associated with exposure (inhalation and ingestion) to contaminated residential soils, tailings, wind blown dust, and miscellaneous waste rock piles in the town of Basin, OU1, which contained elevated concentrations of arsenic, lead and manganese. These metals correlated positively with other COPC metals and were used as indicators during the removal of residential soils, tails piles, ore and waste rock piles. Groundwater utilized for local wells in OU1 was sampled and evaluated for metals. Results did not exceed Drinking Water MCLs or State standards.

Evaluation of risks to the environment (plants, animals, etc) were deferred to the Basin Watershed OU2 risk assessment process by the ROD. Surface water and sediment in Basin Creek and parts of the Boulder River were determined to be contaminated (copper, lead and mercury) and represent a recreational risk as it flows through the Town of Basin. Contaminant sources for surface water reside with remnant historic mining activities and waste located upstream in OU2, the Watershed. Remedial action for this media will be addressed in the OU2 Record of Decision anticipated in 2009.

The chemicals of potential concern (COPC) for this site are: antimony, arsenic, cadmium, copper, iron, lead, manganese, mercury thallium, and zinc. Of these constituents, arsenic, lead, and manganese were detected at elevated concentrations in residential soils and mine waste piles throughout the town and represent the primary soil contaminants of concern (COC).

The selected remedy (ROD) for OU1 addressed the direct exposure of the human population to elevated concentrations of hazardous substances, pollutants, and contaminants in the

residential soil and residual mine waste by removal and placement of these source materials in an offsite repository (Luttrell Repository). Clean borrow material was imported to replace excavated contaminated material and the areas (both residential and nonresidential) were revegetated.

In spite of its inclusion in the OU1 ROD, the Basin Mill Site, located east of town, was not remediated as part of the OU1 cleanup actions. Therefore, it is not being reviewed as part of this 5-year review. Ultimately, EPA has two options for addressing future remediation of this facility: issue a unilateral administrative order (UAO) to the property owner for site cleanup, or incorporate the site into remedial action under the Basin Watershed, OU2. The mill site as it stands today, represents little risk to the residents of the Town. Berms prevent snowmelt and storm water runoff from leaving the site, and the owner's dogs and signage discourage trespassing by the general public.

This 5-year review determined that the remedy was constructed in a manner consistent with the requirements of the Record of Decision (ROD). Human health and the environment are protected in the short term through the removal of contaminant source material manifested throughout town in waste rock piles, residual tailings, and contaminated residential soils. The contaminated source materials were then placed in a managed waste repository. However, in order for the remedy to be protective in the long term, the following actions need to be taken:

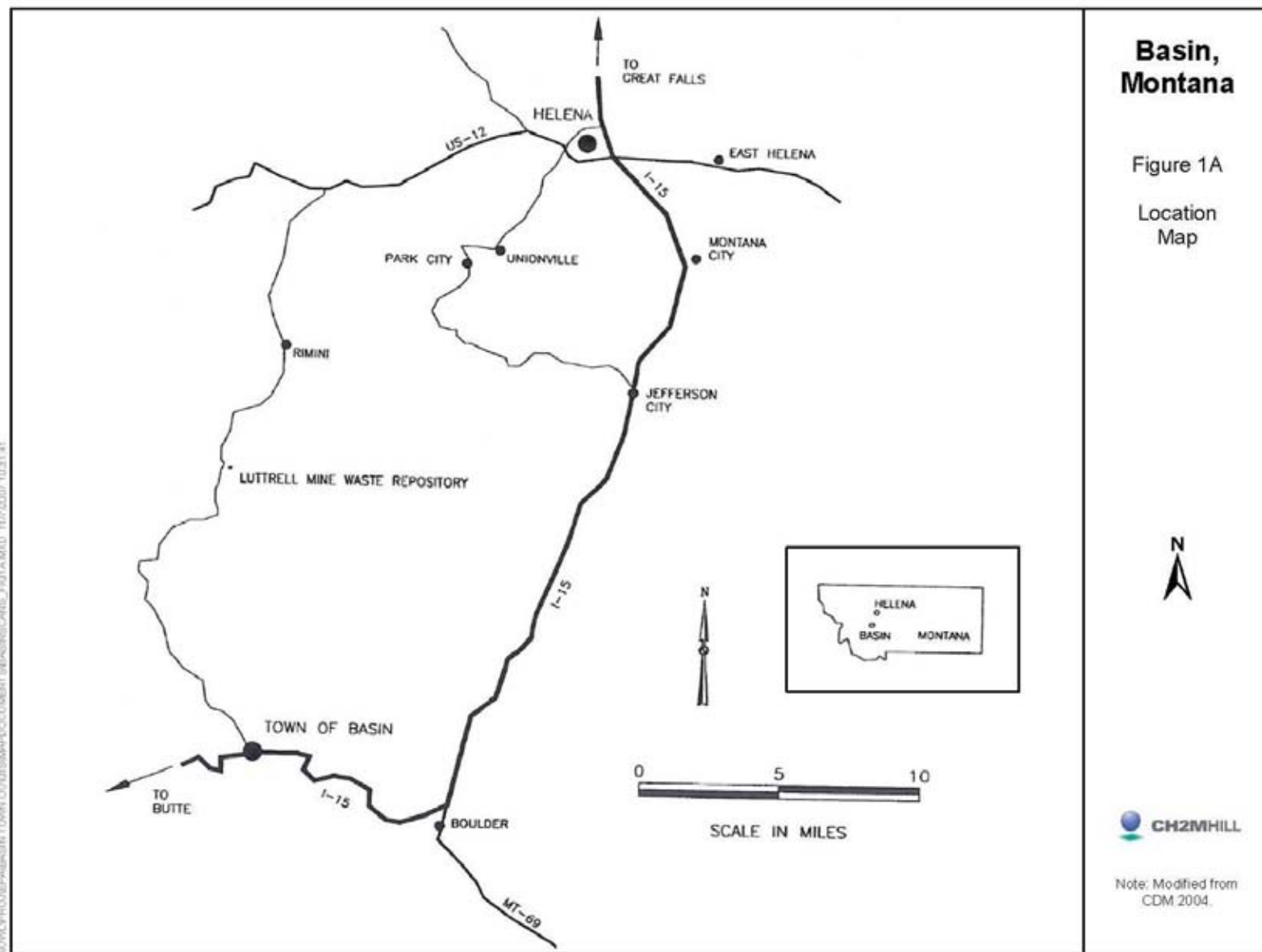
- Application of Institutional controls to those properties:
 - That denied EPA access and permission to remediate their yards (1 property - Deed Restriction suggested).
 - That retain contaminated soils underlying structures (suggest a Deed Restriction describing process for the removal/disposal of contaminated soils prior to rebuilding should the structures be destroyed).
- Creation of a process that informs residents and recreationists about the dangers of ingesting Basin Creek water or its use in irrigation of lawns and gardens, and discourages recreational contact with creek water and associated sediment until remediation of OU2 is complete and the threat of contamination no longer exists (suggest EPA informational fliers for distribution to residents and recreationists).
- Creation of a periodic monitoring process (by EPA or the State of Montana) to assess wind and runoff erosion impacts to remediated and unremediated properties.

Once Institutional Controls are implemented, the remedy should be considered protective. As such, it is suggested that EPA look for portions of OU1 worthy of delisting.

In addition, it is recommended that a separate document explaining significant differences from the ROD and incorporated into the remedial action, be prepared by EPA and be appended to the remedial file. The significant differences were incorporated during the remedial action to accommodate unanticipated site conditions and should not be interpreted as making the remedy less protective. Actions suggested for inclusion in the document include:

- Formal documentation that Streamside Source Area T-2b along the Boulder River was excluded from the RA because of its inaccessible location (along Interstate right-of-way between the fence and the river) and small volume (52 cubic yards), both of which limit potential human exposure. Given its present location, mobilization of this material into the river would be gradual, and occur only during flood events which would also act to dilute the material reducing any potential ecological impact as well.
- Formal documentation that the Ore pile located north of town was removed to the Luttrell Repository by the property owner, and confirmation sampling was performed by EPA to confirm that the cleanup met appropriate criteria.
- Formal documentation that additional residential properties and mine waste source areas, not included in the original final basis of design reports, but identified during RA construction, were remediated consistent with remedies described in the ROD as directed by USEPA. (Remedial action construction on residential properties was completed in November 2003 and 2004). For example:
 - Three streamside areas adjacent to Source Areas T-5, T-6, and T-7 were not originally included in the cleanup plans, but were added when arsenic and lead contamination was discovered adjacent to these source areas.
 - The initial excavation limits at the horse pasture east of Valley Road were significantly increased based on sampling performed before cleanup of this property.
 - The initial excavation limits at four streamside source areas (Source Areas T-3, T-5, T-6, and the horse pasture east of Valley Road) were reduced to protect lowland and streambank areas currently stabilized with vegetation.
 - USEPA and DEQ agreed that additional vertical excavation was not required in recreational source areas for manganese in floor samples that met cleanup goals for arsenic and lead and were at least 12 inches bgs. Clean backfill placed over the excavation surface reduced the risk of recreational exposure to residual manganese contamination.
 - One streamside area to the west of the WWTP in the Basin Creek floodway was not originally included in the cleanup plans. This area was added to the cleanup plans when arsenic and lead contamination was discovered in surface soils above initial excavation criteria in 2003 (CDM, 2004a).
 - An area in the MDT right-of-way to the north of Source Area T-9 was not originally included in the cleanup plans. This area was added to the cleanup plans when arsenic, lead, and manganese contamination was discovered in surface soils above initial excavation criteria in 2004.

- One nonrecreational source area (11 Pine) was not originally included in the cleanup plans for 2004. This property had been previously remediated during the 2003 and 2004 construction seasons, except for contaminated soil and mine waste beneath buildings. The property changed ownership between 2003 and 2004, and the new owners decided to demolish two of the structures on the property, which exposed the underlying contaminated soils and mine waste. These areas of the property were added to the cleanup plans because of the newly exposed contaminated soils and mine waste.





Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (from WasteLAN): Town of Basin Project – Operable Unit 1		
EPA ID (from WasteLAN): MTD 982572562 – OU1		
Region: 8	State: MT	City/County: Basin/Jefferson County
SITE STATUS		
NPL Status: <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify)		
Remediation Status (choose all that apply): <input type="checkbox"/> Under Construction <input type="checkbox"/> Operating <input checked="" type="checkbox"/> Complete		
Multiple OUs?* <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Construction completion date: 11/2004
Has site been put into reuse? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
REVIEW STATUS		
Lead agency: <input checked="" type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency _____		
Author name: Kristine Knutson		
Author title: Remedial Project Manager		Author affiliation: U.S. EPA, Region 8
Review period:** 09/01/07 to 01/31/08		
Date(s) of site inspection: 10/03/07		
Type of review: <input checked="" type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL-Removal only <input type="checkbox"/> Non-NPL Remedial Action Site <input type="checkbox"/> NPL State/Tribe-lead <input type="checkbox"/> Regional Discretion		
Review number: <input checked="" type="checkbox"/> 1 (first) <input type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify) _____		
Triggering action: <input type="checkbox"/> Actual RA Onsite Construction at OU #____ <input checked="" type="checkbox"/> Actual RA Start at OU#1 <input type="checkbox"/> Construction Completion <input type="checkbox"/> Previous Five-Year Review Report <input type="checkbox"/> Other (specify)		
Triggering action date (from WasteLAN): 09 /01 /2002		
Due date (five years after triggering action date): 09/01/07		

* ["OU" refers to operable unit.]

** [Review period corresponds to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form, cont'd.

Issues

The following issues listed in Table ES-1 were identified during the 5-year review process.

TABLE ES-1
Issues of Concern

Item No.	Issue	Affects Current Protectiveness	Affects Future Protectiveness
1	<p>Institutional controls need to be implemented relevant to the following:</p> <ul style="list-style-type: none"> Residential property at 10 Gold Street was not remediated Contaminated soils located under structures at 86 Frontage Road and 46 Quartz were not remediated The water in Basin Creek, which runs through the town of Basin, has elevated metal concentrations originating from historic mining activity upstream in the watershed. Residents and recreationists should be informed of the risks associated with ingestion, irrigation with this water, or direct contact with sediments. Remediated areas are not being inspected periodically to make sure that the integrity of the remedy is not compromised by erosion. 	<p>Yes- although the property is currently vegetated, the potential for exposure still exists should any excavation or excess erosion occur on the property.</p> <p>Yes - although the property is currently vegetated, the potential for exposure still exists should any excavation associated with building demolition/replacement occur on the property.</p> <p>Yes – no institutional control for educating residents about acceptable use of Basin Creek water.</p> <p>Yes – the potential for exposure exists should residual wastes not completely removed be exposed by some form of erosion</p>	<p>Yes – should the property change hands, new owners need to be informed of the contaminated soils, the potential for uncontrolled exposure, and the need to remove and dispose of the soils.</p> <p>Yes – should these buildings be demolished, workers and residents could be exposed to underlying contaminated soils. Deed restrictions could prescribe removal and disposal options that would go into effect when appropriate and help safeguard future residents from exposure.</p> <p>Yes – until the Basin Watershed OU 2 cleanup has been implemented, residents should be informed of the risk associated with the use of the Basin Creek water and associated sediments.</p> <p>Yes – If long term erosion compromised the existing remedy, then future protectiveness could be affected</p>
2	<p>Basin Mill site was not remediated, nor was it assessed as part of this 5-yr. review. However it is identified as an issue of concern because of its proximity to the east end of town.</p>	<p>Yes – although this site is private property, wind and runoff erosion remain a source of potential exposure to local residents</p>	<p>Yes – this site, until it is remediated, represents a long term exposure risk to local residents</p>

- The initial excavation limits at Source Areas T-8 and T-9 were increased in the field based on minimal characterization sampling performed during excavation of these areas, as well as visual identification of contaminated soils at vertical and horizontal design limits.
- The initial excavation limits at Source Area T-10 were reduced to protect lowland and streambank areas currently stabilized with vegetation and mature growth conifer trees to be left in place at the request of the property owner. The initial excavation limits were also reduced since large portions of the source area were predominantly larger cobble with little or no fine-grained soil.
- Formal documentation of the decision for inclusion of the Basin Mill Site under remedial actions proposed for cleanup as part of the Basin Watershed OU2, or to pursue cleanup to ROD specifications through a Unilateral Administrative Order to the owner of the Basin Mill property.

Recommendations and Follow-up Actions

Corresponding recommendations/follow-up actions are listed in Table ES-2.

TABLE ES-2
Recommendations and Follow-up Actions

Item No.	Issue	Recommendations and Follow-up Actions	Responsible Party	Due Date
1	Formal ICs	Implement the following:		
		Develop and file property deed restrictions with County for unremediated property and properties with residual contaminated soil under structures. Deed restrictions should describe the risk associated with exposure to the soils and describe a process for the removal/disposal of contaminated soils, prior to general excavation activities or rebuilding, if the structures are ever destroyed.	EPA	6/2008
		Develop fact sheet to educate property owners about the acceptable use of Basin Creek water until OU2 can be cleaned up.	EPA	6/2008
		Monitor the 10 Gold Street (unremediated property), 86 Frontage Rd/46 Quartz (Residual contamination under structures) and periodically inspect other capped and remediated areas for excessive erosion and lack of vegetation (Biannual monitoring through next 5 yr. report)	EPA	6/2008
2	Basin Mill Site	Implement a UAO against property owner or formally include in the cleanup of OU2, Basin Watershed.	EPA	12/2008

Protectiveness Statement(s)

Region 8 believes that the response actions carried out for the Town of Basin OU1 have addressed the immediate threats, but the remedy is not yet fully protective until institutional controls are fully implemented.

The remedy at the Town of Basin OU1 currently protects human health and the environment as a result of the removal of contaminant source material. Contaminant source material is no longer a direct contact, ingestion, or inhalation threat because the remedy was properly implemented. Contamination of Basin Creek or the Boulder River from mining wastes within OU1, from overland flow of snowmelt or stormwater runoff, is no longer a threat because these wastes were removed. Shallow groundwater contamination from the infiltration of water leaching through contaminated wastes has been mitigated by the remedy.

However, in order for the remedy to be protective in the long term, the following actions need to be taken:

- Application of Institutional controls to those properties:
 - That denied EPA access and permission to remediate their yard (1 property - Deed Restriction suggested).
 - That retain contaminated soils underlying structures (suggest a Deed Restriction describing process for the removal/disposal of contaminated soils prior to rebuilding should the structures be destroyed).
- Creation of a process that informs residents about the dangers of ingesting Basin Creek water or its use in irrigation of lawns and gardens until remediation of OU2 is complete (suggest EPA informational fliers for distribution to residents).
- Creation of a periodic monitoring process (by EPA or the State of Montana) to assess wind and runoff erosion impacts to remediated and unremediated properties.

Once Institutional Controls are implemented, the remedy should be considered protective. As such, it is suggested that EPA look for portions of OU1 worthy of delisting.

1.0 Introduction

1.1 Purpose of the Review

The U. S. Environmental Protection Agency (USEPA) Region 8 has conducted a statutory Five-Year Review of the Town of Basin Operable Unit (OU) 1 site located in Jefferson County, Montana. This review was conducted from September through February 2008 and is the first Five-Year Review for this site.

The purpose of Five-Year Reviews is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and recommendations to address them.

The Five-Year Review is intended to verify that the remedy is operating and functioning as designed, and that institutional controls are in place and are protective, as well as to evaluate whether the remedial actions (RA) taken to date remain protective of human health and the environment. If the review determines that a remedy is no longer protective, appropriate action to correct the remedy may be initiated. Removal of the site from the National Priorities List (NPL) neither affects the need for a Five-Year Review, nor does it prevent restoring the site to the NPL without application of the Hazardous Ranking System.

1.2 Authority for Conducting the Five-Year Review

The Agency is preparing this five-year review pursuant to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121 and the National Contingency Plan (NCP). CERCLA Section 121 states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

The agency interpreted this requirement further in the NCP; 40 Code of Federal Regulation (CFR) 300.430(f)(4)(ii) states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

1.3 Who Conducted the Five-Year Review

The USEPA Region 8 conducted this Five-Year Review of the RAs implemented at the Town of Basin OU1 site in Jefferson County, Montana. This Five-Year Review was conducted from September 2007 through February 2008. This report documents the results of the review and was prepared by CH2M HILL under contract to the U.S. Army Corps of Engineers (USACE).

1.4 Other Review Characteristics

This is the first Five-Year Review for the Town of Basin OU1 site. The triggering action for this review is the initiation of the RA in September 2002. This Five-Year Review is required because hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

2.0 Site Chronology

TABLE 1
Chronology of Site Events

Event	Date
Timberline Reclamations, Inc. completed an environmental analysis on the mill tailings dispersal in Basin along the Boulder River for the Montana Highway Department. (now Montana Department of Transportation [MDT]).	May 1980
The Montana Department of Health and Environmental Sciences (MDHES, now Department of Environmental Quality [DEQ]) prepared a Preliminary Assessment (PA) for the site. Based on the findings of the PA, a Screening Site Inspection (SSI) was performed to characterize waste sources in and around the Town of Basin.	September 1989
USEPA collected surface soil samples from the Basin School yard, two fields near the school yard, houses near the school yard, and areas outside of the town.	January 1990
MDHES collected surface soil samples from the southwest corner of the Basin School yard.	April 1990
MDHES collected subsurface soil samples from eight of the previous sample locations in the southwest school yard. MDHES recommended that the Basin School Board take preventive actions to limit exposure to children. Oral communication with a representative of the School Board revealed that clean fill was placed over the southwest corner of the school yard.	June 1990
USEPA completed an Expanded Site Inspection (ESI) to develop additional data for site characterization.	August 1992
Montana Department of State Lands Abandoned Mine Reclamation Bureau (MDSL AMRB) conducted a PA for the Basin Mill site.	1993
USEPA conducted a Removal Action in an area at the south end of Valley Street. Approximately 5,000 cubic yards (cy) of contaminated soil/ tailings were excavated and disposed at the mine waste repository in Butte, Montana. The excavated areas were backfilled with clean soil, graded, fertilized, seeded, and mulched.	1998
USEPA collected soil samples throughout the Town of Basin. Both surface (0-6 inches) and subsurface (12 inches) soil samples were collected.	1999
The Town of Basin OU1 and Basin Watershed OU2 were placed on Superfund NPL.	October 1999
USEPA conducted a field investigation at the Town of Basin OU1 to collect data from areas that were not sampled during previous investigations and to collect additional samples where historical data were questionable. USEPA collected and analyzed surface soil samples and groundwater samples, and excavated five test pits in the area east of the Wastewater Treatment Plant (WWTP) to determine the depth of the mining waste material and if there was direct contact between the mining waste material and groundwater.	April through July 2000
USEPA completed the final human health and risk assessment report and the final remedial investigation report for OU1	October 2000
Remedial Investigation/Feasibility Study complete	December 2000
Proposed Plan was issued for public comment	December 27, 2000
ROD signature	March 2001
Remedial design complete	September 2001
Superfund State Contract Agreement	December 27, 2001
Remedial Action start	September 2002
Remedial Action complete	October 2004

3.0 Background

3.1 Physical Setting and Characteristics

The Basin Mining Area Superfund Site is located within and around the Town of Basin in Jefferson County, Montana (Figure 1). The community of Basin is located in Sections 17 and 18, Township 6 North, Range 5 West in the Basin quadrangle (Figure 1). The coordinates of the site are approximately 46°16'10" north latitude and 112°16'46" west longitude (Ecology & Environment [E&E] 1991).

The Town of Basin, an unincorporated municipality, is located within the Boulder River watershed and has a population of approximately 255 permanent residents according to the 2000 U.S. Census Bureau.

The town is situated at an approximate elevation of 5,350 feet above mean sea level within the watershed valley. Steep foothills rise approximately 500 feet above the surrounding valley on the east and west sides of Basin Creek and the south side of the Boulder River. Interstate Highway 15 crosses the town in an east-west direction and generally parallels the Boulder River within the watershed valley.

3.2 Land and Resource Use

Residential, small commercial, and recreational activities continue in the Town of Basin. Restaurants, small businesses, and a WWTP remain with residential homes. (CDM 2000)

Currently, the town is unincorporated and government is administered by the Jefferson County Board of Commissioners. Three commissioners represent the different districts in the county. The Town of Basin is in District 2. As an unincorporated community within the County, Basin residents receive County services, such as road maintenance, solid waste collection, public health and safety service, and extension services. The Board of Commissioners is also responsible for managing local land use planning, disaster and emergency services, district courts, tax collection, and maintaining libraries. Jefferson Valley Conservation District provides leadership in the wise use of soil, water, and related resources within the District.

The Town of Basin is committed to preservation of a strong historic and environmental heritage. The town has applied for nomination for listing on the National Register of Historic Places.

3.3 History of Contamination

The following sections discuss the history of contamination at the site.

3.3.1 Basin Mining Area

Hard rock mining in the Basin Mining Area Superfund Site began in the 1870s and continued intermittently into the late 1950s. Primary sources of contamination consist of

numerous scattered mine waste rock piles and tailings piles resulting from historical mining and ore processing in the town of Basin in the late 1800s and early 1900s. The chemicals of potential concern (COPC) for this site are: antimony, arsenic, cadmium, copper, iron, lead, manganese, mercury thallium and zinc. Historical mining activities upstream of the town are also a source of contamination due to discharges to Basin Creek, which passes directly through town, or to the Boulder River on the south edge of town. Releases from these sources have resulted in contamination of soil, surface water, sediment, groundwater, air, and biota. Evidence of these releases includes elevated concentrations of contaminants in soil, surface water, and sediment; visual staining of stream sediments; observed mine wastes on streambanks; and noticeable erosion of wastes away from source piles.

3.3.2 Specific – Town of Basin

The Town of Basin OU1 consisted of contaminated residential soils, a former smelter, streamside tailings, several tailings pile areas, and a mill site as shown in Figure 2. The town's water supply comes from a series of groundwater wells. Sampling of the wells during the remedial investigation resulted in no detections above drinking water standards. Table 2 presents a summary of RI groundwater sampling results.

TABLE 2
Groundwater Sample Results Presented in the Record of Decision (March 2001)

Chemical	Minimum Detected Concentration	Maximum Detected Concentration	Safe Drinking Water MCLs (mg/L)	Detection Frequency	Rationale for Contaminant Deletion or Selection
Antimony (mg/L)	0.0023	0.0023	0.006	1/8	BSL
Arsenic (mg/L)	0.00196	0.0034	0.05	4/9	ASL
Barium(mg/L)	0.0243	0.0685	2.0	7/8	BSL
Cadmium (mg/L)	0.001	0.001	0.005	1/9	BSL
Chromium(mg/L)	ND	ND	0.1	0/8	BSL
Copper (mg/L)	0.0014	0.0911	1.3	6/9	BSL
Iron (mg/L)	0.0122	0.376	0.3	7/8	BSL
Lead (mg/L)	0.0011	0.003	0.015	2/9	NSL
Manganese (mg/L)	0.0117	0.107	0.05	2/8	BSL
Mercury(mg/L)	ND	ND	0.002	0/8	NSL
Silver (mg/L)	ND	ND	0.035	0/8	BSL
Thallium (mg/L)	0.0018	0.0018	0.002	2/8	BSL
Zinc (mg/L)	0.0139	0.45	2.1	9/9	BSL

mg/L = milligrams per liter

NA = not available

ND = not detected

ASL = maximum concentration above screening level

BSL = maximum concentration below screening level

NSL = no screening level; chemical is retained as a chemical of potential concern



Basin Creek flows through the Town of Basin. Results of surface water sampling during the remedial investigation indicated a number of chemicals of concern (COC) above water quality standards as shown in the following table. Most of the sources contributing to surface water contamination are associated with historic mining activities located upstream in the Basin Watershed OU 2. The Basin Watershed OU 2 is presently working through the CERCLA remedial process, which will eventually mitigate contaminant source contributions to Basin Creek. Table 3 presents a summary of RI surface water sampling results.

TABLE 3
Surface Water Sample Results Presented in the Record of Decision (March 2001)

Chemical	Minimum Detected concentration	Maximum Detected Concentration	Montana WQB7 Surface Water Stds (ug/L)	Detection Frequency	Rationale for Contaminant Deletion or Selection
Antimony (ug/L)	52.4	52.4	6.0	1/9	ASL
Arsenic (ug/L)	3.1	10.0	18.0	8/9	ASL
Barium (ug/L)	24.3	133.0	2000	4/9	BSL
Cadmium (ug/L)	0.49	237.0	5.0	2/9	ASL
Chromium (ug/L)	2.35	6.0	100	3/9	BSL
Copper (ug/L)	10.6	12600	1300	4/9	ASL
Iron (ug/L)	148.0	2760	300*	8/9	BSL
Lead (ug/L)	1.0	1420	15	8/10	NSL
Manganese (ug/L)	29.9	8390	24*	4/9	ASL
Mercury (ug/L)	ND	ND	0.05	0/9	NSL
Silver (ug/L)	ND	ND	35	0/9	BSL
Thallium (ug/L)	ND	ND	1.7	0/9	ASL
Zinc (ug/L)	17.8	5020	2100	9/9	BSL

mg/L = milligrams per liter

ug/L = microgram per liter

*= secondary MCL based on Acute Aquatic Life Standard based on taste, odor, staining for guidance.

NA = not available

ND = not detected

NE = not established

ASL = maximum concentration above screening level

BSL = maximum concentration below screening level

NSL = no screening level; chemical is retained as a chemical of potential concern

During the RI/FS process, approximately 28 residences were identified as having contaminated soils resulting from historic mining-related activities. The residences are scattered through town and in many cases the older structures were built on preexisting mine waste associated with local mills.

In addition to the 28 residential areas identified as having contaminated soils from historic mining-related activities, several other mining impacted sites existed in OU1. They are listed below:

- The Jib Mill/Hope-Katie Mine complex is located on the south side of the Boulder River immediately southwest of town. This waste source area was originally used as an ore extraction site and a small milling operation. Remnants of former structures remain in this area. The Jib Tailings were located east of the Jib Mill Site. This area consisted of two impoundments that contained milling waste materials. Tailings were also present along the edges of the pits.
- A smelter stack flue is located on a steep hill on the west edge of town north of I-15. The smelter stack has visibly poor structural integrity. It has been reported that the smelter stack was never used for any mining operations. Samples collected during the remedial investigation (RI) eliminated the flue as a waste source.
- The Basin Mill site is located immediately east of town. This is a former ore processing facility. Several structures related to the ore processing operation are still located on site, including the main process building, a crusher, and a tailings pond. There are tailings piles and waste rock piles remaining at the site. This area was omitted from the OU1 RA plan when the Basin Mill property owner applied for a groundwater discharge permit as an action toward re-opening the mill. It was expected that the clean up of the site would be completed as a requirement of the State discharge permit. However, it does not appear that the State permit addresses remediation to the specificity required by the Basin OU1 ROD. Therefore, the site should be included for cleanup under OU2. Alternatively, EPA could issue a Unilateral Administrative Order to the Basin Mill owners ordering them to conduct the removal to ROD specifications.
- A WWTP is located south of I-15, east of Basin Creek. This facility was constructed in a former tailings pond in 1975. The WWTP has one aeration pond approximately 15 feet deep and four percolation ponds each approximately 5 feet deep. The facility also contains a control building, a water supply well, and three monitoring wells (Morrison-Maierle, 1978).
- The area east of the WWTP was historically used as a tailings impoundment for upstream milling operations. This property is currently part of the Merry Widow Health Mine and Campground.
- The Atwater Mill reportedly stood immediately west of the access road to the Merry Widow Mine, and the tailings pond lay roughly west of that access road. The exact location of the mill ruins cannot be identified from historical research or existing remains. This mill operated in the early 1900s and reworked the tailings from the Katie/Jib Mill.
- The Basin Street Tailings were located near the center of town north of Basin Street and west of Quartz Avenue. The area located at the base of a hill contained a large pile of mining waste material. A collapsed mine head frame structure is located on the top of the former waste pile.

3.4 Initial Response

USEPA completed a Time-Critical Removal Action in 1998 in an area located at the south end of Valley Street in the town of Basin. Approximately 5,000 cubic yards of contaminated soil/tailings were excavated and disposed of at the mine waste repository in Butte, Montana. After confirmation sampling, the excavated areas were backfilled with clean soil, graded, fertilized, seeded, and mulched. Cleanup of the early removal site was performed to ROD specifications per personal communication (2008) with the EPA RPM at the time, Jim Harris.

3.5 Basis for Taking Action

On October 22, 1999, USEPA placed the Basin Mining Area site on the Superfund NPL. A human health risk assessment conducted as part of the remedial investigation/feasibility study (RI/FS) process was completed in 2000. Based on the current and anticipated future land and water uses at the site, USEPA identified human receptors potentially exposed to COPCs. These populations consist of residents, recreational users, and workers (for example, people involved in mining, including reclamation and/or remediation). Residents who live in areas affected by mining wastes *and* who engage in recreational activities within the site were presumed to have the most exposure. The results of the risk assessment indicated that exposure to elevated levels of metals as a result of historical mining activities could pose an unacceptable health risk to humans. The greatest risk is attributable to arsenic, lead, and manganese.

Considering the potential health concerns identified, USEPA determined that a response action for the Town of Basin OU1 was warranted to protect human health. The process for selecting a remedy for OU1 was detailed in the FS and ROD, and is summarized in the following sections.

4.0 Remedial Actions

4.1 Remedy Selection

The objectives of the remedial designs and RAs as described in the ROD were to:

- Prevent direct exposure of the residents to elevated contaminant concentrations in soil and mine waste
- Control erosion of contaminated soil by wind and water from the source locations
- Control airborne transport of mine waste particles, especially fine-grained materials such as tailings
- Control erosion of mine waste into local water courses
- Control leaching and migration of contaminants from mine waste into surface water and groundwater

The selected remedy described in the ROD included Removal/Transportation/Disposal (Luttrell Repository)/Institutional Controls. As part of the selected remedy, the contaminated soil and mine wastes were to be removed to a single-lined, fully encapsulated repository. The principal components of the selected alternative as presented in the ROD are as follows:

- Removal of all of the contaminated soil from the residential yards, the streamside tailings, the WWTP tailings, the area east of the WWTP, Basin Street Tailings, the ore pile north of Basin, and the Jib Tailings, and placement in the Luttrell Repository (OU3).
- Residential cleanup goals applied to remediated sites were defined under the guidance of the Human Health Risk Assessment as 120 milligrams per kilogram (mg/kg) arsenic and 1,000 mg/kg lead.
- Backfilling with clean soil and revegetation of all excavations.
- Implementation of Institutional controls, which are measures to control or prevent future land use, or other measures to provide information to current/future land owners, only if wastes remain in inaccessible areas such as beneath residential structures and if risks associated with such mine waste are identified.
- Allocation of a portion of the operation and maintenance of the Luttrell Repository to OU1 based on an estimate of the waste from OU1 in proportion to the estimated total volume of the Luttrell Repository.

The waste piles and tailings remediation from the Basin Mill Site were omitted from the Selected Remedy until USEPA and the state could investigate and determine the scope of any reclamation that could be addressed under a state permit to operate the mill site and a groundwater pollution permit for the tailings impoundment. At the time the ROD was written, USEPA believed that neither permit would likely require full reclamation of the

impacts of historic milling activities. However, since the Basin Mill Site was still operational, USEPA decided to rely on the State permits to achieve interim protection. Furthermore, USEPA believed that the remedial actions performed throughout the remainder of the site would mitigate threats to human health and the environment. When USEPA determined what, if any, reclamation would be accomplished under the state permit(s), USEPA planned to modify all RAs determined appropriate, to remediate contaminant sources not addressed under the state permit(s). These actions would include, but not be limited to, complete removal of all contaminated materials to the Luttrell Repository or other actions to prevent the migration of contaminants from the mill site from any waste materials left in place at the mill site. At this point, it appears that USEPA will formally include the Basin Mill Site with in the Basin Watershed OU2, or issue a Unilateral Administrative Order to the owner of the Basin Mill Site.

USEPA decided the Selected Remedy was protective of human health and the environment through the following:

- All of the contaminated soil would be removed from the residential yards, the streamside tailings, Basin Street Tailings, the Jib Tailings, and the source areas near the wastewater treatment plant. The ore pile located north of Basin and the upper 2 feet of contaminated soil beneath this pile would also be removed.
- All excavations would be backfilled with clean soil and revegetated, preventing direct exposure of the Basin residents to contaminants in surficial soil.
- Placement of the waste material in the Luttrell Repository would control both erosion and airborne transport of contaminants in the town. Removal would also reduce leaching and migration of contaminants from mine waste into groundwater and erosion of contaminants into surface water.
- While the removal of waste material could cause a short-term exposure to airborne contamination during excavation and transportation, this exposure risk would be reduced by dust control measures implemented during the actual construction of this Selected Remedy.
- The institutional controls component of this alternative for mine waste (proprietary controls, information, and educational programs) would continue to control direct exposure to the contaminants that may be inaccessible, if risks associated with such mine waste were identified.

4.2 Remedy Implementations

Appendix C provides pictures documenting site conditions, historic and post remedy, at various residences and waste source areas.

4.2.1 Year 2002 Activities

Construction activities were initiated on September 16, 2002 and continued to November 8, 2002. Remediation activities were completed at 26 residential properties and the Basin School yard. Remediation activities were initiated, though not completed at the Basin Street

Tailings site in 2002. Remediation was performed according to the specifications and design drawings, except for the following deviations:

- The property at 10 Gold was not remediated because the property owner declined to grant access for cleanup work.
- The property at 76 Basin was not originally included in the cleanup plans, but was added when arsenic and lead contamination was discovered along the property boundary with 78 Basin.
- The initial excavation limits at 2 Silver were significantly increased in the field based on sampling performed before cleanup on this property.
- Reclamation types were changed (for example driveway replaces grass area, etc) for several properties at the request of property owners.
- Plans for site fixture (e.g., fences, rock walls, etc) removal and restoration were changed for several properties at the request of property owners.

During the 2002 construction season, at the request of property owners, soil samples were collected from 23 additional properties. Remediation was recommended for 11 properties within the Town of Basin. These recommendations were made based on the soil sample results for arsenic and/or lead concentrations. The 11 sites recommended for remediation during the 2003 construction season were as follows:

- Basin Street tailings
- Alley north of 76 Basin
- Lot east of 114 Basin/parking area between 110 Basin and 114 Basin
- 123 Basin
- 2 Basin Creek Road
- Equipment yard
- 11 Pine
- 2 Silver horse corral
- 35 Valley
- 40 Valley
- Horse pasture east of Valley

Confirmatory sampling was performed in accordance with the final Sampling and Analysis Plan (SAP) (CDM, 2002). All initial excavations were completed to minimum depths of 2 feet below ground surface (bgs) in accordance with the property-specific cleanup plans.

Confirmation samples were collected from the excavation floor and sidewalls to verify cleanup goals (120 mg/kg for arsenic and 1,000 mg/kg for lead) were met. If laboratory results indicated that cleanup goals were not met, an additional 1 foot of soil from the excavation floor and/or sidewalls was excavated and an additional round of samples was collected. In some instances, mine waste was identified visually and excavation proceeded horizontally and/or vertically until the waste was removed before samples were collected. This process would continue until laboratory results indicated cleanup levels were met, unless groundwater, streambanks, building structures, property boundaries, or slope stability issues were encountered. Quality assurance protocols as described in the SAP were followed.

4.2.2 Year 2003 Activities

Construction activities were initiated on June 24, 2003, and continued to October 29, 2003. Remediation activities were completed at 21 individual cleanup areas (6 residential properties, 6 source areas classified as nonrecreational-use properties, and 9 source areas classified as recreational-use properties).

Residential cleanup areas were located directly adjacent to occupied homes or businesses and usually required moderate to extensive coordination with affected property owners during cleanup due to site fixtures and controlled property access (for example, fences and gates). The six residential areas included the following:

- 123 Basin
- 2 Basin Creek Road
- 35 Valley
- 40 Valley
- Alley north of 76 Basin
- Lot east of 114 Basin

Nonrecreational source areas were located in the vicinity of occupied homes or businesses and usually required some coordination with affected property owners during cleanup because of controlled access. Nonrecreational source areas do not have the potential for continual recreational use (for example, all-terrain vehicle use) because of their proximity to occupied homes or businesses. The six nonrecreational areas included the following:

- 11 Pine
- 2 Silver horse corral
- Basin Street tailings
- Equipment yard
- Horse pasture east of Valley
- Parking area between 110 Basin and 114 Basin

Recreational source areas were generally located away from occupied homes and businesses and required minimal coordination with affected property owners during cleanup.

Recreational source areas have the potential for continual recreational use because of their distance from occupied homes and businesses and the lack of controlled access. These areas are generally located within the stream corridor of Boulder River. The nine recreational areas included the following:

- Jib Tailings
- Area southwest of Source Area T-5
- Source Area T-1
- Source Area T-2a
- Source Area T-3
- Source Area T-4
- Source Area T-5
- Source Area T-6
- Source Area T-7

Excavated wastes were hauled to the Luttrell Repository from the Town of Basin starting the last week of June through the last week of September 2003. Excavated wastes were stockpiled to maximize efficiency of construction equipment, and stockpiled wastes were loaded on “belly dump” trailers for hauling to the Luttrell Repository.

Remediation was performed according to the specifications and design drawings, except for the following deviations approved by USEPA and DEQ:

- Variances from gradation and contaminant concentration specifications for backfill were approved to allow the use of specific sources. Variances allowed the use of local soil borrow areas that varied from the original gradation and contaminant concentration specifications, but did not exceed arsenic or lead based standards defined in the ROD.
- Three streamside areas adjacent to Source Areas T-5, T-6, and T-7 were not originally included in the cleanup plans, but were added when arsenic and lead contamination was discovered adjacent to these source areas.
- The initial excavation limits at the horse pasture east of Valley Road were significantly changed in the field based on sampling performed before cleanup of this property.
- The initial excavation limits at four streamside source areas (Source Areas T-3, T-5, T-6, and the horse pasture east of Valley Road) were reduced to protect lowland and streambank areas currently stabilized with vegetation.
- Reclamation types were changed for several properties at the request of property owners.
- Plans for site fixture removal and restoration (e.g. fences, rock walls, etc) were changed for several properties at the request of property owners.
- The final grade and drainage and erosion protection measures for Jib Tailings were modified from the original cleanup plan because of technical and logistical constraints.
- The shallow river crossing and the deep river crossing designs were modified to address comments from the U. S. Fish and Wildlife Service (USFWS).
- Seed and vegetative revetment reclamation was not completed in 2003 because of the onset of winter weather. Seed reclamation was completed on April 14, 2004. Vegetative revetment reclamation was completed on May 12, 2004, after spring runoff from snowmelt had receded.

Confirmatory sampling was performed to verify that soils remaining after excavation within cleanup areas met cleanup goals for arsenic and lead (120 mg/kg and 1,000 mg/kg, respectively). Soils within recreational source areas were also required to meet the cleanup goal for manganese of 469 mg/kg. Confirmatory sampling was performed in accordance with the final SAP (CDM, 2002).

Characterization soil samples were collected from several cleanup areas before and during excavation. The purpose of these samples was to determine whether potentially contaminated soils identified by color variations (either within or outside initial excavation limits) had concentrations of arsenic, lead, and/or manganese above cleanup goals. The results were used to either justify exclusion of soils from removal (cleanup goals were met)

or were used to expand initial excavation limits. Excavation then proceeded to minimum depths within the initial excavation limits in accordance with the area's cleanup plan. In some instances, subsurface mine wastes were visually identified and excavation of these wastes proceeded horizontally and/or vertically until the wastes were removed before samples were collected. If the visually identified subsurface wastes comprised a large volume of soil, characterization samples were collected to confirm the wastes exhibited contaminant concentrations above cleanup goals. After excavation limits were reached and visually identifiable wastes were removed, confirmation samples were collected from grids established on the excavation floor and sidewalls to verify that cleanup goals were met for each grid. If laboratory results indicated that cleanup goals were not met for a sample location, then soil from the excavation floor and/or sidewalls represented by the sample was excavated and additional samples were collected. If laboratory results indicated that cleanup goals were met for all sample locations within a grid, then excavation within the grid was deemed complete. Additional samples were not collected if groundwater was reached or if samples were not representative of the soil matrix (for example, rocky subsoil composed of cobbles and boulders). This iterative excavation/sampling process continued until laboratory results indicated cleanup goals were met or technical constraints prevented further soil removal. These technical constraints included the following:

- Building foundations
- Groundwater
- Paved areas
- Property boundaries without a signed access agreement
- Roads or streets that are heavily traveled (paved areas are considered capped, unpaved areas do not represent a major exposure pathway because of the traffic deterrent and because they are capped with gravel and compacted)
- Rocky subsoil composed of cobbles and boulders
- Steep hillsides that provide a clean soil cover over wastes
- Streambanks or lowland areas currently stabilized by vegetation

In addition, USEPA and DEQ agreed that additional vertical excavation was not required in recreational source areas for manganese in floor samples that met cleanup goals for arsenic and lead and were at least 12 inches bgs. Clean backfill placed over the excavation surface reduced the risk of recreational exposure to residual manganese contamination.

Confirmation sampling was not performed at three cleanup areas south of Boulder River. These areas included the following:

- Area East of Source Area T-7
- Area Southeast of Source Area T-6
- Area Southwest of Source Area T-5

Contaminated soil within these areas was limited in horizontal and vertical extent and was easily identifiable visually. These areas were adjacent to larger cleanup areas (Source Areas T-5, T-6, and T-7) that had been sampled extensively, and technical constraints (steep

hillsides or vegetated streambanks) prevented additional soil removal. USEPA decided that confirmation sampling was not required in these areas because of these issues. Quality assurance/quality control (QA/QC) protocols as described in the final SAP (CDM, 2002) were followed. QC duplicate samples were collected during confirmation sampling as specified in the final SAP.

4.2.3 Year 2004 Activities

Construction activities were initiated on June 7, 2004, and continued to October 7, 2004.

Remediation activities were completed at six individual cleanup areas (two source areas classified as a nonrecreational-use properties, and four source areas classified as recreational-use properties).

The two nonrecreational source areas included the following:

- 11 Pine
- Area west of the WWTP

The four recreational source areas included the following:

- Source Area T-8
- Source Area T-9
- Source Area T-10
- MDT right of way north of Source Area T-9

Excavated wastes were hauled to Luttrell Repository from the Town of Basin.

Remediation was performed according to the specifications and design drawings, except for the following deviations approved by USEPA and DEQ:

- Variances from gradation and contaminant concentration specifications for backfill were approved to allow the use of specific sources. Variances allowed the use of local soil borrow areas that varied from the original gradation and contaminant concentration specifications, but did not exceed arsenic or lead based standards defined in the ROD.
- One streamside area to the west of the WWTP in the Basin Creek floodway was not originally included in the cleanup plans. This area was added to the cleanup plans when arsenic and lead contamination was discovered in surface soils above initial excavation criteria in 2003 (CDM, 2004a).
- An area in the MDT right-of-way to the north of Source Area T-9 was not originally included in the cleanup plans. This area was added to the cleanup plans when arsenic, lead, and manganese contamination was discovered in surface soils above initial excavation criteria in 2004.
- One nonrecreational source area (11 Pine) was not originally included in the cleanup plans for 2004. This property had been previously remediated during the 2003 and 2004 construction seasons, except for contaminated soil and mine waste beneath buildings. The property changed ownership between 2003 and 2004, and the new owners decided to demolish two of the structures on the property, which exposed the underlying

contaminated soils and mine waste. These areas of the property were added to the cleanup plans because of the newly exposed contaminated soils and mine waste.

- The initial excavation limits at Source Areas T-8 and T-9 were increased in the field based on minimal characterization sampling performed during excavation of these areas, as well as visual identification of contaminated soils at vertical and horizontal design limits.
- The initial excavation limits at Source Area T-10 were reduced to protect lowland and streambank areas currently stabilized with vegetation and mature growth conifer trees to be left in place at the request of the property owner. The initial excavation limits were also reduced since large portions of the source area were predominantly larger cobble with little or no fine-grained soil.
- Oversized rock and structural wood timbers were placed within deep excavation areas at Source Area T-9.
- Reclamation type for a portion of streamside source area T-8 was changed from river rock to native seed to protect a streambank area currently stabilized with vegetation.
- Reclamation type for streamside source area T-10 was changed from vegetative revetment to grading and river rock to match the surrounding area once the excavation limits were significantly reduced.
- A herbicide mixture (Tordon™ and ammonium sulphate) was applied to large fields adjacent to the equipment and materials staging to control noxious weed infestations from vehicle and equipment movement.
- The contractor applied 88.7 tons of hot mix asphalt to sections of Basin Street at the end of the 2004 construction season at the request of MDT. Certain areas of asphalt on this street had become stressed and cracked from the 3 years of haul truck traffic in this area associated with this project.
- Cleanup activities were performed at 19 Gold in 2002. Contaminated soil in the west yard was removed, and clean fill and growth media was replaced. A small retaining wall composed of loose rock separated this yard (at a higher elevation) from the lower driveway at the adjacent residence to the west. The retaining wall became unstable in 2003 and started sloughing into the adjacent property to the west. The probable cause of the sloughing was excessive watering of the new sod lawn, which caused saturated soils to exert pressure on the loose wall. Attempts in 2003 to restack the rock wall were unsuccessful. USEPA decided in 2004 to replace the loose rock wall with a new concrete retaining wall. Preparation work for this wall began on October 1, 2004. The new concrete retaining wall was completed by October 6, 2004.

4.3 Conclusions and Recommendations

The RA for the Town of Basin OU1 was conducted between 2002 and 2004. All mine waste source areas identified in the final basis of design report (CDM, 2001) were remediated. All but one of the residential properties identified in the final basis of design report (CDM, 2001) were remediated. The lone exception (10 Gold) was not remediated because

the property owner decided not to grant USEPA access for cleanup activities. As previously discussed in this document, the Basin Mill facility represents the only industrial site that was not remediated during this cleanup action. Additional residential and mine waste source area properties not included in the original 'final basis of design reports' were identified through sampling between 2002 and 2004 during RA construction. These properties were remediated as directed by USEPA. RA construction was completed in fall 2004.

At the conclusion of construction, it was recommended that mine waste source areas remediated during the 2004 construction season be periodically monitored through June 2005 and perform follow-up maintenance if necessary for the following potential issues:

- Lack of vegetation (native seed) establishment at reclamation areas
- Presence of noxious weeds in reclamation areas
- Compromised integrity of placed backfill due to excessive erosion or settlement

EPA followed-up with periodic visual inspections through 2005.

5.0 Five-Year Review Process

5.1 Administrative Components

Activities associated with the Basin Town, Montana, Five-Year Review were led by Kristine Knutson, USEPA Region 8 Project Manager for OU 1. The following team members assisted in the review:

- Vincenzo Cirafisci/ USACE Kansas City District Colorado
- USACE Contractor CH2M HILL/Boise Office (P. Dennis Smith/Project Manager; Deanne Fischer/Project Engineer; Jeff Schut/Risk Assessor; John Lincoln/Sr. Review Engineer)

The Five-Year Review consisted of the following activities:

- Review of relevant project documents by the project team comprised the initial steps of the 5-year review process.
- A site visit of the Town of Basin was conducted on October 3, 2007. Those in attendance included EPA's Project Manager, Montana DEQ Project Manager, and two representatives from CH2M HILL.
- Interviews with community members and current property owners were conducted by EPA on December 7 and 10, 2007.
- Review of applicable or relevant and appropriate requirements (ARARS) was performed by the State of Montana.

5.2 Community Involvement

EPA prepared and posted, in local news papers, a public notice describing the 5 year review process for the Town of Basin. Interviews with Community representatives and local residents performed to obtain insight and local perspective on the performance of the remedy. Copies of the public notices and interviews are included in Appendix B

5.3 Town of Basin Interviews

On December 7 and 10, 2007, Kris Knutson/USEPA interviewed four residents of the Town of Basin to determine their interest or concerns regarding the Five-Year Review of the remedy that USEPA concluded in 2004. In general, those interviewed were aware of USEPA's remedy performed in Basin, and had very few concerns with the effectiveness of that remedy. The individuals interviewed were:

- Megan Bullock, the Jefferson County Sanitarian
- Commissioner Notbohm, Jefferson County Commissioner
- Michelle Letexier, a nurse and the school board chair
- Chuck Goodwin, Basin resident

Listed below is a summary of comments from the interview process. The actual questions and responses from the interviews are presented in Appendix B.

- All interviewees were familiar with Basin's Superfund history and the implementation of the cleanup.
- Only one person interviewed was dissatisfied with the cleanup performed. Their dissatisfaction was based on the perception that an inadequate volume of replacement backfill material used on his property.
- Only one of those interviewed requested additional information on the 5-year review process and outcome.
- No additional information was offered by those interviewed on the success or failure of the remedy. Some interest was expressed in the future of OT mining property and the associated Basin Mill facility.
- Those interviewed did not appear to have a strong interest in updates on the success of the remedy that the 5-year review process might generate. Most seemed to prefer to get future information from the newspaper, mail, school board or water board meetings and indicated that others in the community felt the same. All seemed to understand how to contact EPA should they have future questions.

6.0 Technical Assessment

6.1 Question A: Are the Remedies Functioning as Intended by the Record of Decision?

No. The review of documents, ARARs, risk assumptions, and the results of the site inspection (performed October 3, 2007) by USEPA, DEQ, and contractor CH2M HILL, indicates that the remedy in part appears to be functioning as intended by the ROD, but not in total. Review of remedial targets revealed the following:

1. Residential yards involved in the remedy are vegetated and showed little or no signs of localized erosion.
2. Former waste source piles and tailings, previously scattered throughout OU1, are gone and replaced with top soil and vegetation.

Removal of contaminated soils and replacement with clean material and vegetation have achieved remedial objectives by:

- eliminating direct residential exposure (ingestion and inhalation) to contaminant sources, and controlling localized runoff and wind erosion of the remediated areas.
 - eliminating the potential for Basin Creek and the Boulder River to be directly contaminated from over land flow from snowmelt and stormwater runoff.
 - eliminating the infiltration of contaminated surface water into the shallow groundwater by the removal of contaminated source materials.
3. The institutional controls are not yet implemented.
 - During the assessment of the remedy it was noted that that one property was not remediated at the request of the landowner, and at two residences (86 Frontage Road and 46 Quartz) contaminated soils were not removed from under existing structures. To sustain long term protection around these locations and for the remedy in general, some form of institutional controls through the local County should be implemented. For instance, deed restrictions could be applied to these properties that inform new potential buyers of site conditions, describe a process for removing and disposal of the contaminated soils should use or ownership of the property change or structures be replaced, and identify a government entity who will provide guidance if requested.
 - Institutional controls are also suggested to educate townspeople about acceptable uses of Basin Creek water until the remedy for Basin Watershed OU2 has been successfully implemented. Periodic monitoring (annual or biannual) of remediated areas for excessive erosion should also be implemented by the government as a means of protecting this functioning remedy.

6.2 Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives (RAOs) Used at the Time of Remedy Selection Still Valid?

Yes. The exposure assumptions, toxicity data, cleanup levels and remedial action objectives used at the time of the remedy are still valid. The narrative below describes changes that have occurred since the remedy was selected, and why those changes have not affected the validity of the remedy.

6.2.1 Changes to Standards and Criteria

In January 2006, USEPA lowered the arsenic maximum contaminant level (MCL) from 0.050 to 0.010 mg/L. Maximum detected concentrations of arsenic in both groundwater and surface water samples used for the risk assessment were at or below the *new* MCL. The USEPA revision does not affect the remedy selected. There have been no additional changes in standards or criteria that affect the protectiveness of the remedy for groundwater and surface water.

TABLE 4
Changes in Chemical-Specific Standards

Contaminant	Media	Cleanup Level	Standard		Citation/Year
Arsenic	Groundwater and surface water	NA	Previous 0.05 mg/L	New 0.010 mg/L	SDWA 1988 & 2006

SDWA = Safe Drinking Water Act

The State of Montana performed an ARARs evaluation (See Appendix A) to identify any recent changes in State laws or contaminant standards that might influence the acceptability of the existing remedy. The conclusions of the ARARs analyses are as follows:

- Various citations and references have changed since the identification of the ARARs in the ROD. For example, WQB-7 is now known as Circular DEQ-7 (February 2006).
- Two groundwater standards have been changed. However, since the scope of the remedy was mine waste removal, the changes to groundwater standards (Arsenic and Zinc standards now at 10 and 2000 ug/L, respectively) would not affect the remedy.
- There have been updates to General Permits for Stormwater Discharge: for construction activities the reference would be to Permit No. MTR 100000 (April 16, 2007); for mining activities the reference would be to Permit No. MTR 300000 (November 17, 2002); and for industrial activity the reference would be to Permit No. MTR 000000 (October 1, 2006).

Upon review, the State concluded that none of the substantive requirements that apply to the remedy at this site have changed in any manner that would affect the protectiveness of the remedy. See 40 CFR 300.430(f)(1)(ii)(B)(1).

6.2.2 Changes to Exposure Pathways

Current and anticipated future land and water uses at or near the Basin OU1 site have not changed since the ROD, therefore the exposure pathways evaluated remain valid at this time. Contaminated soil areas with elevated metals concentrations above cleanup levels have been excavated and backfilled with clean soil to a minimum depth of 2 feet. This eliminated the exposure to contaminated soils at those locations and reduced the overall risk to residents. Additionally, the soil removal reduced the potential migration of metals to groundwater.

There are areas within the Basin site that are paved or have existing buildings. These areas could not be sampled during the investigation; therefore, soil contamination beneath these remains unknown. As long as these structures or paved areas remain in place, a complete exposure pathway is absent.

Common practice for calculating soil preliminary remediation goals (PRG) for cleanup goals would include ingestion, inhalation, and dermal routes of exposure. The Basin Area risk assessment and PRGs do not quantitatively account for the dermal and inhalation route of exposure to contaminants in soil. The risk assessment correctly indicates that these routes would not contribute significantly to overall risk, however it should be noted that dermal absorption factors are available for COPCs at the site. Although exclusion of these exposure routes may have slightly underestimated risk, the remedy in place is still considered protective because the portion of risk attributable to these routes of exposure would be marginal for the metals of concern. Additionally, the removal of surface soil containing elevated COPC concentrations and subsequent backfilling with clean soil effectively removes these exposure pathways.

6.2.3 Changes to Toxicity Factors or Contaminant Characteristics

Cancer slope factors and reference doses used for COPCs during the human health risk assessment and the development of PRGs have not changed since the ROD. Revisions to USEPA's Integrated Exposure Uptake Biokinetic (IEUBK) model for lead have been made since completion of the risk assessment, however these changes would not result in meaningful changes in the remedial decisions.

6.2.4 Changes in Risk Assessment Methodology

USEPA has published several new risk assessment guidance documents since the ROD. The following new guidance documents were reviewed to verify that the remedy at the Basin site is valid:

- U.S. Environmental Protection Agency. 2005a. *Guidelines for Carcinogen Risk Assessment*. March.
- U.S. Environmental Protection Agency. 2004b. *Risk Assessment Guidance for Superfund—Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment)*, Final. July.
- U.S. Environmental Protection Agency. 2002. *Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites*.

- U.S. Environmental Protection Agency. 2005b. *Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens*. March.
- U.S. Environmental Protection Agency. 2003. *Adult Lead Model Spreadsheet*. OSWER Directive 9285.7-54.
- U.S. Environmental Protection Agency. 2004a. *Integrated Exposure Uptake Biokinetic Model for Lead in Children (IEUBK)*.

Considering the Basin site potential receptors, routes of exposure, contaminants of concern, and new guidance, exposure assumptions, toxicity data, cleanup levels and remedial action objectives used at the time of remedy selection are still valid.

6.3 Question C: Has any Other Information Come to Light That Could Call Into Question the Protectiveness of the Remedy?

No. As previously discussed, the lack of institutional controls and postponement of the remedial fate of the Basin Mill site represent the only recent significant information relevant to the long term protectiveness of the remedy. The lack of influence of IC's on short term protectiveness was discussed in previous sections.

Remediation of the Basin Mill site was originally considered in the ROD as part of the cleanup of the Town of Basin OU1. The Basin Mill includes a settling pond and approximately 11,000 cubic yards of waste in numerous piles of residual ore, waste rock and miscellaneous mine waste. During implementation of the OU1 remedial action (RA), EPA made the decision not to include the then operating mill site as part of the cleanup. Hence, the Basin Mill site was not remediated as part of OU1, therefore it was not assessed as part of this 5-year review.

Because of its location (out of Basin Town proper) and private ownership (that discourages trespassing) the Mill site does not adversely effect the protectiveness of the OU1 remedy in the short term. However, to promote long term protectiveness of the OU1 remedy, contaminated source material associated with the Basin Mill site must be remediated.

6.4 Technical Assessment Summary

According to the data reviewed, the site inspection, and the interviews, the remedy appears to be functioning as intended by the ROD. There have been no changes to the physical conditions of the site that would affect the protectiveness of the remedy, with the exception of the Basin Mill site, as previously discussed. Most ARARs for soil contamination cited in the ROD have been met. There have been no changes in the toxicity factors for the COCs that were used in the baseline risk assessment, and there have been no changes to the standardized risk assessment methodology that could affect the protectiveness of the remedy. There is no new information other than resolving the status of the Basin Mill site and application of institutional controls that calls into question the long term protectiveness of the remedy.

7.0 Issues

Some issues of concern were discovered during the Five-Year Review. Those worthy of consideration include the following, which are summarized in Table 5.

TABLE 5
Issues of Concern

Item No.	Issue	Affects Current Protectiveness	Affects Future Protectiveness
1	<p>Institutional controls need to be implemented relevant to the following:</p> <ul style="list-style-type: none"> Residential property at 10 Gold Street was not remediated Contaminated soils located under structures at 86 Frontage Road and 46 Quartz were not remediated <p>The water in Basin Creek, which runs through the town of Basin, has elevated metal concentrations originating from historic mining activity upstream in the watershed. Residents and recreationists should be informed of the risks associated with ingestion, irrigation with this water, or direct contact with sediments.</p> Remediated areas are not being inspected periodically to make sure that the integrity of the remedy is not compromised by erosion. 	<p>Yes- although the property is currently vegetated, the potential for exposure still exists should any excavation or excess erosion occur on the property.</p> <p>Yes - although the property is currently vegetated, the potential for exposure still exists should any excavation associated with building demolition/replacement occur on the property.</p> <p>Yes – no institutional control for educating residents about acceptable use of Basin Creek water.</p> <p>Yes – the potential for exposure exists should residual wastes not completely removed be exposed by some form of erosion. The urgency of this issue is mitigated because of the thorough removal strategy employed.</p>	<p>Yes – should the property change hands, new owners need to be informed of the contaminated soils, the potential for uncontrolled exposure, and the need to remove and dispose of the soils.</p> <p>Yes – should these buildings be demolished, workers and residents could be exposed to underlying contaminated soils. Deed restrictions could prescribe removal and disposal options that would go into effect when appropriate and help safeguard future residents from exposure.</p> <p>Yes – until the Basin Watershed OU 2 cleanup has been implemented, residents should be informed of the risk associated with the use of the Basin Creek water and associated sediments.</p> <p>Yes – If long term erosion compromised the existing remedy, then future protectiveness could be affected</p>
2	<p>Basin Mill site was not remediated, nor was it assessed as part of this 5 yr. review. However it is identified as an issue of concern because of its proximity to the east end of town.</p>	<p>Yes – although this site is private property, wind and runoff erosion remain a source of uncontrolled potential exposure to local residents</p>	<p>Yes – this site, until it is remediated, represents a long term exposure risk to local residents</p>

8.0 Recommendations and Follow-up Actions

The corresponding recommendations/follow-up actions are summarized in Table 6

TABLE 6
Recommendations and Follow-up Actions

Item No.	Issue	Recommendations and Follow-up Actions	Responsible Party	Due Date
1	Formal ICs	Implement the following:		
		Develop and file property deed restrictions with County for unremediated property and properties with residual contaminated soil under structures. Deed restrictions should describe the risk associated with exposure to the soils and describe a process for the removal/disposal of contaminated soils prior to general excavation activities or rebuilding should the structures be destroyed.	EPA	6/2008
		Develop fact sheet to educate property owners and recreationist about the acceptable use of Basin Creek water until OU2 can be cleaned up	EPA	6/2008
		Monitor the 10 Gold Street (unremediated property), 86 Frontage Rd/46 Quartz (Residual contamination under structures) and periodically inspect other capped and remediated areas for excessive erosion and lack of vegetation (Biannual monitoring through next 5 yr. report)	EPA	6/2008
2	Basin Mill Site	Implement a UAO against property owner or formally include in the cleanup of OU2, Basin Watershed.	EPA	12/2008

9.0 Protectiveness Statements

The RA for the Town of Basin OU1 was conducted between 2002 and 2004. All mine waste areas identified in the final basis of design report (CDM, 2001a) were remediated. All but one of the residential properties identified in the final basis of design report (CDM, 2001b) were remediated. The lone residential exception (10 Gold Street) was not remediated because the property owner decided not to grant USEPA access for cleanup activities. The lone industrial exception (Basin Mill Site) was not remediated, nor was it assessed as part of this 5-year review.

Assessment of this five-year review found that the remedy was constructed in a manner consistent with the requirements of the Record of Decision (ROD).

The remedy at the Town of Basin OU1 currently protects human health and the environment as a result of the removal of contaminant source material. Contaminant source material is no longer a direct contact, ingestion, or inhalation threat because of this remedy was properly implemented. Contamination of Basin Creek or the Boulder River from overland flow of snowmelt or stormwater runoff is no longer a threat. Shallow groundwater contamination from the infiltration of water leaching through contaminated wastes has been mitigated by the remedy.

However, in order for the remedy to be protective in the long term, the following actions need to be taken:

- Application of Institutional controls to those properties:
 - That denied EPA access and permission to remediate their yards (1 property - Deed Restriction suggested).
 - That retain contaminated soils underlying structures (suggest a Deed Restriction describing process for the removal/disposal of contaminated soils prior to rebuilding should the structures be destroyed)
- Creation of a process that informs residents and recreationists about the dangers of ingesting Basin Creek water or its use in irrigation of lawns and gardens, and to avoid direct contact with stream sediments until remediation of OU2 is complete and contamination is no longer a threat (suggest EPA informational fliers for distribution to residents and recreationists).
- Creation of a periodic monitoring process (by EPA or the State of Montana) to assess wind and runoff erosion impacts to remediated and unremediated properties.

Once Institutional Controls are implemented, the remedy should be considered protective. As such, it is suggested that EPA look for portions of OU1 worthy of delisting.

10.0 Next Review

Because hazardous substances, pollutants, or contaminants remain at the site that are above levels that allow for unrestricted use and unlimited exposure, another Five-Year Review is required. The next Five-Year Review will be conducted no later than January 2012, but may be conducted earlier at USEPA's discretion.

11.0 Documents Cited and Reviewed

CDM Federal Programs Corporation (CDM). 2000. Community Relations Plan for Basin Mining Area Superfund Site, Town of Basin Operable Unit 1 (OU1), Watershed Operable Unit 2 (OU2), Jefferson County, Montana. March.

CDM Federal Programs Corporation (CDM). 2001. Final Basis of Design Report for Basin Mining Area Superfund Site, Town of Basin Operable Unit 1 (OU1), Mine Waste Source Area Remediation, Jefferson County, Montana. August.

CDM Federal Programs Corporation (CDM). 2002. Final Sampling and Analysis Plan for Basin Mining Area Superfund Site, Town of Basin Operable Unit 1 (OU1), Residential Remediation, Jefferson County, Montana. September.

CDM Federal Programs Corporation (CDM). 2003. Cleanup Status Report, Residential Remediation, Town of Basin Operable Unit (OU1). May.

CDM Federal Programs Corporation (CDM). 2004a. Cleanup Status Report, Residential Remediation, Town of Basin Operable Unit (OU1). June.

CDM Federal Programs Corporation (CDM). 2004b. Cleanup Status Report, Residential Remediation, Town of Basin Operable Unit (OU1). December.

Ecology and Environment, Inc. (E&E). 1991. Field Activities Report, Expanded Site Inspection, Basin Schoolyard, Basin, Montana. October.

CDM Federal Programs Corporation (CDM) 2001. Meeting Summary. Town of Basin Project Meeting. March 29.

Morrison-Maierle. 1978. Wastewater Collection and Treatment Facility and Water system Improvements for Basin, Montana. Construction Plans. January.

CDM Federal Programs Corporation (CDM) 2001. Record of Decision, Town of Basin Project, Operable Unit 1, Basin Mining Area, Jefferson County, Montana. March.

U.S. Environmental Protection Agency (USEPA). 2001. Administrative Order on Consent for Removal Action. August 21.

U.S. Environmental Protection Agency (USEPA). 2002. *Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites*.

U.S. Environmental Protection Agency (USEPA). 2003. Adult Lead Model Spreadsheet. OSWER Directive 9285.7-54.

U.S. Environmental Protection Agency (USEPA). 2004a. Integrated Exposure Uptake Biokinetic Model for Lead in Children (IEUBK).

U.S. Environmental Protection Agency (USEPA). 2004b. *Risk Assessment Guidance for Superfund–Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment)*, Final. July.

United States Environmental Protection Agency (USEPA). 2004c. Remedial Action Completion Report, Town of Basin, Operable Unit 1 of the Basin Mining Area Superfund Site, Montana. December 16.

U.S. Environmental Protection Agency (USEPA). 2005a. *Guidelines for Carcinogen Risk Assessment*. March.

U.S. Environmental Protection Agency (USEPA). 2005b. *Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens*. March.

Appendix A
Comments Received from Support Agencies
and/or the Community

Town of Basin—Analysis of State Requirements

"Smith, Brad" <brads@mt.gov>

To: Kristine Knutson/MO/R8/USEPA/US@EPA

12/17/2007 01:41

Subject: Town of Basin—Analysis of State Requirements

Kris,

The State has reviewed the State of Montana requirements in the Record of Decision for the Town of Basin OU 1. Various other citations and references have changed since the identification of the ARARs in the ROD. For example, WQB-7 is now known as Circular DEQ-7 (February 2006).

Two groundwater standards have been changed. However, since the scope of the remedy was mine waste removal, the changes to groundwater standards (Arsenic and Zinc standards now at 10 and 2000 ug /L, respectively) would not affect the remedy. There have been updates to General Permits for Stormwater Discharge: for construction activities the reference would be to Permit No. MTR 100000 (April 16, 2007); for mining activities the reference would be to Permit No. MTR 300000 (November 17, 2002); and for industrial activity the reference would be to Permit No.

MTR 000000 (October 1, 2006). Upon review, the State concludes that none of the substantive requirements that apply to the remedy at this site have changed in any manner that would affect the protectiveness of the remedy. See 40 CFR 300.430(f)(1)(ii)(B)(1).

(1) Requirements that are promulgated or modified after ROD signature must be attained (or waived) only when determined to be applicable or relevant and appropriate and necessary to ensure that the remedy is protective of human health and the environment.

If you have any questions, please let me know.

Brad

12/8/07

Basin, MT • Saturday, December 8, 2007

INDEPENDENT



5 Year Review for the Town of Basin Mining Area

EPA listed the Basin Mining Area to the Superfund National Priorities List on October 22, 1999, due to mining waste problems in the watershed and mining waste in the Town of Basin. The mining area includes both the Town of Basin, and the watersheds of Basin and Cataract Creek and portions of the Boulder River below the confluence with these heavily impacted streams. Contaminants of concern include antimony, cadmium, iron, mercury, thallium, lead, copper, zinc, and arsenic. The small historic mining community of Basin is the focus of this 5 Year Review. EPA and the Montana DEQ issued a Record of Decision in March of 2001 calling for cleanup of contaminated yard soils, and cleanup of contaminated materials at a former smelter, several tailings piles areas, streamside tailings, and a mill site. The cleanup activities were performed in 2002, 2003, and were completed in 2004.

EPA is beginning a Five Year Review of the cleanup actions taken to date at the Town of Basin Mining Area Site. As the name implies, Five Year Reviews are required no less frequently than every five years. This will be the first Five Year Review for this Site.

The Review will include an evaluation of the protectiveness of remediation conducted in the Town, and will verify that the remedy is operating and functioning as designed. The Review will evaluate whether the remedial actions take to date remain protective of human health and the environment. The Review will also include information collected during recent interviews with community members and local officials.

Anyone wishing to provide information or comments to be considered as part of this review can send them by December 28, 2007 to:

Kris Knutson
US EPA, Montana Office
10 West 15th Street, Suite 3200
Helena, Montana 59626

knutson.kristine@epa.gov

fax: (406) 457-5055

EPA expects to complete the Five Year Review by January 15, 2008.

From: Nancy Owens
To: Kristine Knutson/MO/R8/USEPA/US@EPACOM>
cc
Subject: 5-Yr Review Basin Mining Area
Date: 12/27/2007
Time: 01:19 PM

Here are my comments in regard to the 5-Year Review for the Town of Basin Mining Area, in response to the notice published in the Boulder Monitor.

My comment addresses "the remedial action taken to date remains protective of human health and the environment."

As far as I know, the clean-up of Basin tailings was completed ok; however, we need to stay apprised of the long term impact of the environmental impacts to Basin and Cataract creeks, and potentially to the Basin water supply.

At one of the very first public meetings, called by the Forest Service, before EPA's direct involvement, about the clean-up of mine tailings in the Basin and Cataract Creek drainages, one of the citizens said, "It makes no sense to put all your poisoned eggs in one basket at the top of the Continental Divide and the head of our watershed" (referring to the plan to deposit all the tailings in the Lutrell Pit). In other words, clean-up of tailings is a good idea, but putting them in the Lutrell Pit, which we all know now has leakage problems, is fool hardy.

I would like to stay informed of the status of leakage from the Lutrell Pit and settling ponds.

Nancy Owens
Box 38
Basin, MT 59631

Appendix B

Community Interview Responses and Public Notice

Town of Basin Interviews

On December 7 and 10, 2007, Kris Knutson of EPA interviewed four residents of the Town of Basin to determine their interest or concerns regarding the 5-year review of the remedy that EPA concluded in 2004. In general, those interviewed were aware of EPA's remedy performed in Basin, and had very few concerns with the effectiveness of that remedy. The individuals interviewed were:

1. Megan Bullock, the Jefferson County Sanitarian
2. Commissioner Notbohm, Jefferson County Commissioner
3. Michelle Letexier, a nurse and the school board chair
4. Chuck Goodwin, Basin resident

Listed below are the questions asked in each of the interviews, with a summary of the responses provided.

Q1. Are you aware of the history and remedial efforts concerning the Town of Basin Superfund Site?

A1: All of the interviewees were aware of Basin's Superfund history and the remedy that was performed there. Some attended public meetings that were held, and Megan Bullock's husband worked up at the Luttrell repository.

Q2. Do you have any concerns or issues with the cleanup efforts that have been conducted to date?

A2. Only Chuck Goodwin had a concern, and it was that he felt an insufficient amount of backfill was brought in to replace soil removed from his back yard.

Q3. Do you need any information about the Town of Basin Superfund Site 5-year review process?

A3. Most did not feel they needed any additional information. Megan Bullock requested a copy of the 5-year Review Report for her files.

Q4. Do you have any information that may be helpful for the 5-year review?

A4. Most did not have any information to offer. Micky Letexier was concerned about the OT mining site in Basin.

Q5. Do you know how to contact the US Environmental Protection Agency with any questions that may arise?

A5. All interviewees were provided with my business card.

Q6. What do you think the community wants to know?

A6. Most did not think others in the community wanted much more than a simple explanation of what the 5-year review findings are.

Q7. How do you prefer to get information about important issues?

A7. Interviewees prefer to get information through the newspaper, mail, or email, or through the school board or water board.

Q8. Who else should we be talking to?

A8. Some names were provided, see interview forms.

Q9. Is there anything else you would like to add?

A9. Most did not have anything further to add.

Post-It® Fax Note	7671	Date	12/19	# of pages	▶
To	Dennis Smith	From	Kirk		
Co./Dept.		Co.			
Phone #		Phone #			
Fax #		Fax #			

5 Year Review for the Town of Basin Mining Area



EPA listed the Basin Mining Area to the Superfund National Priorities List on October 22, 1999 due to mining waste problems in the watershed and mining waste in the town of Basin. The mining waste problems both the Town of Basin and the water shed of Basin and Cataraugus Creek and portions of the Boulder River below the confluence with these headwater streams. Contaminants of concern include mercury, selenium, iron, nickel, copper, lead, zinc, and arsenic. The small historic mining community of Basin is the focus of this 5-Year Review. EPA and the Montana DEC issued a Record of Decision in March of 2001 calling for cleanup of contaminated yard soils and cleanup of contaminated materials from former tailings piles areas, stream bed cleanings, and a full site. The cleanup activities were performed in 2002-2003 and were completed in 2004.

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Kris Knutson
US EPA, Montana Office
10 West 16th Street Suite 3200
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knutson.kristine@epa.gov
fax: (406) 457-5055

EPA expects to complete the Five Year Review by January 15, 2008.

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Appendix C

Photos Documenting Site Conditions



Residences

- 11 Pine
- 16 Spruce
- 17 Quartz
- 21 Quartz
- 28 Quartz
- 32 Valley
- 33 Quartz
- 76 Basin Street
- 127 Basin Street

11 Pine—Photos Before, During and After Remediation (2002)
Inspection Photo is November 2007





November 2007



16 Spruce—Photos Before, During and After Remediation (2002)
Inspection Photo is November 2007





November 2007



17 Quartz—Photos Before, During and After Remediation (2002)
Inspection Photo is November 2007





November 2007



**21 Quartz—Photos Before, During (2002), and After Remediation
Inspection Photo is November 2007**





November 2007





28 Quartz—Photos Before, During and After Remediation (2002)
Inspection Photo is November 2007





November 2007



32 Valley—Photos Before, During and After Remediation (2002)
Inspection Photo is November 2007





November 2007



Back of the Residence (November 2007)



33 Quartz—Photos Before, During and After Remediation (2002)
Inspection Photo is November 2007





October 2007



November 2007



76 Basin Street—Photos Before, During and After Remediation (2002)
Inspection Photo is November 2007





November 2007



**127 Basin (Main) Street—Photos Before, During and After Remediation (2002)
Inspection Photo is November 2007**







November 2007



Unremediated Residences

- 10 Gold Street
- 86 Frontage Road

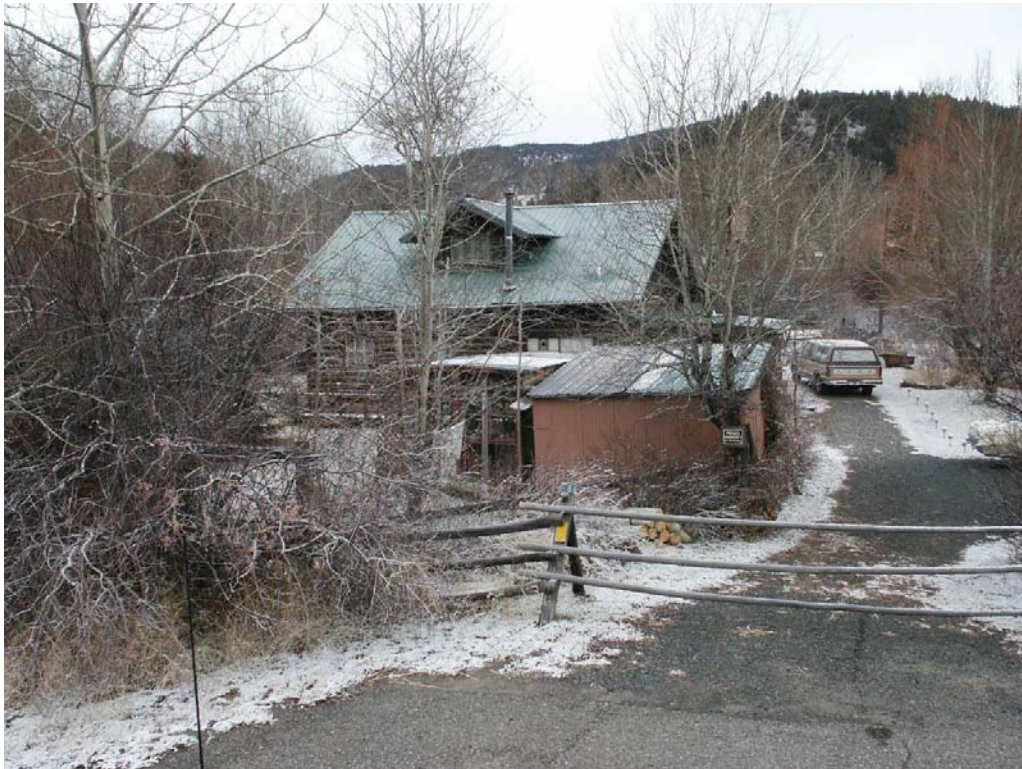
Properties that Refused Remediation

Photos taken in November 2007

10 Gold Street—Owner Would Not Allow Access



86 Frontage Road—Existing Buildings Covering Contaminated Soils



Source Areas

- Jib Tailings
- Area T-9
- Area T-10
- Basin Street Tailings
- Area T-1 & T-2

Jib Tailings Source Area
August 21, 2003



August 31, 2003



Jib Tailings Source Area—September 5, 2003



October 28, 2003



June 4, 2004



October 2007



**Area T-9 West—Looking East
June 11, 2004**



June 11, 2004



**Area T-9 West—Looking East
July 28, 2004**



October 26, 2004



**Area T-9 West—Looking East
October 2007**



**Area T-9 West—Looking South East
July 15, 2004**



July 15, 2004



**Area T-9 West—Looking South
October 2007**



**Area T-9 East—Looking West
June 11, 2004**



June 18, 2004



**Area T-9 East—Looking West
July 21, 2004**



July 28, 2004



Area T-9 East—Looking West, September 15, 2004



October 2007—Looking West



Area T-9 MDT Right of Way—June 24, 2004



October 2007



T-10 Source Area—Looking East
June 8, 2004



June 8, 2004



T-10 Source Area—Looking East, August 18, 2004



September 2007



T-10 Source Area—Looking West, June 8, 2004



August 17, 2004



T-10 Source Area—Looking West, October 2007



October 2007



Basin Street Tailings
July, 2003





Basin Street Tailings—October 2003



Basin Street Tailings—October 2007





Looking Across at Basin Street at Former Mining Waste Source Piles T-1 and T-2A